Beamline 16-ID / HP-CAT

Scientific focus: Study of materials at high pressures in the fields of physics, chemistry, materials science, and planetary science

Scientific programs: Studies of materials under high pressure and variable temperature in diamond-anvil cells and other high-pressure devices using microfocus angle-dispersive diffraction (single crystals and powders), nuclear resonance forward scattering, inelastic scattering, Compton scattering, and emission and absorption spectroscopy

Optics & Optical Performance

16-ID-A

- Be refractive lens (optional)
- fixed-exit double-crystal water-cooled diamond (111) monochromator
- 400 W and 100 W fixed apertures for white beam
- two-crystal branching monochromator: interchangeable water-cooled diamond and Si

16-ID-B

- small Kirkpatrick-Baez microfocusing mirrors

16-ID-C

- four-reflections/high-resolution monochromator
- vertically and horizontally focusing mirrors

Experiment Stations

16-ID-B

- monochromatic side-branch station for micro beam diffraction

16-ID-D

- high-resolution monochromatic nuclear scattering spectroscopy
- monochromatic and white beam for diffraction
- instrument and technique development

16-ID-E

- medium- to high-resolution inelastic x-ray scattering

Detectors

- large-area imaging
- avalanche photodiodes
- Si PIN diodes
- high-resolution crystal analyzer system

Beamline Controls and Data Acquisition

- Windows NT/UNIX-Linux workstations running VME
- EPICS/SPEC control software
- IDL and customized data acquisition/beamline control software

Beamline Support Equipment/Facilities

- custom-designed diffractometers and other sample handling stages
- diamond-anvil cells
- portable large-volume cell *("Paris-Edinburgh" design likely)*
- *in situ* pressure measurement instrumentation
- cryostats
- optical spectrometers
- laser-heating systems (on and off line)

Insertion Device Source Characteristics (nominal)

source	Undulator A
period	3.30 cm
length	2.47 m
effective K_{max} (at minimum gap = 10.5 mm)	2.78
energy range 1st harmonic	2.9 - 13.0 keV
energy range 1st - 5th harmonics	2.9 - 45.0 keV
on-axis peak brilliance at 6.5 keV	9.6×10^{18} ph/sec/mrad²/mm²/0.1% bw
source size at 8.0 keV Σ_x Σ_y	 359 μm 21 μm
source divergence at 8.0 keV $\Sigma_{x'}$ $\Sigma_{y'}$	 24 μrad 6.9 μrad